
CLAIMS

[Claim(s)]
[Claim 1] The postscript mold optical recording medium characterized by having the 1st recording layer to which it has a recording layer on the optical interference layer on the translucent layer on a substrate, and this translucent layer, and this optical interference layer at least, and this recording layer changes from a metal, semimetals, or these alloys, and the 2nd recording layer which consists of germanium.
[Claim 2] The postscript mold optical recording medium characterized by modulation being 60% or more in claim 1.
[Claim 3] The postscript mold optical recording medium characterized by using the 1st recording layer as Au, Cu, Ag, or these alloys in claims 1 or 2, and making thickness of this 1st recording layer into the range of 30nm or less.
[Claim 4] The postscript mold optical recording medium characterized by using the 1st recording layer as aluminum or these alloys in claims 1 or 2, and setting thickness of this 1st recording layer to 20nm or less.
[Claim 5] The postscript mold optical recording medium characterized by arranging the 1st recording layer at a side with the lamination of a recording layer near the plane of incidence of readout light, and the reflection factor of a record mark part falling in claims 3 or 4.
[Claim 6] The postscript mold optical recording medium with which these are characterized by being in the range of 1.9 <=n<=2.50.25 <= nd/lambda <=0.35600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in claims 2, 3, 4, or 5.
[Claim 7] The postscript mold optical recording medium with which these are characterized by being in the range of 1.4 <=n<1.60.33 <= nd/lambda <=0.41600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in claims 2, 3, 4, or 5.
[Claim 8] The postscript mold optical recording medium with which these are characterized by being in the range of 1.6 <=n<=1.90.31 <= nd/lambda <=0.37600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in claims 2, 3, 4, or 5.
[Claim 9] The postscript mold optical recording medium characterized by setting a translucent layer to Au or Ag, and making thickness of this translucent layer into the range of 5-15nm in claim 6.

[Claim 10] The postscript mold optical recording medium characterized by setting a translucent layer to aluminum and making thickness of this aluminum into the range of 1-2nm in claim 6.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the postscript mold optical recording medium in which record playback is possible by the exposure of a laser beam etc.
[0002]
[Description of the Prior Art] There are postscript mold optical recording media, such as CD-R and DVD-R, etc. as a recordable optical recording medium by the exposure of a laser beam. These phase change optical recording media have CD-ROM or DVD-ROM, and playback compatibility, and are used as small-scale distribution media or a medium for preservation.
[0003]
[Problem(s) to be Solved by the Invention] Implementation of the recording density of DVD-ROM which is especially mass media, and the amount of isochore has been a technical problem. When aiming at this broad spread, reservation of the record power margin in high recording density is an especially important technical problem. About this reservation, although record ingredients of an inorganic system, such as a phase change record ingredient and two-layer film which can be alloyed, were advantageous, there was a problem of the tracking signal strength of the drive which uses DPD (Differential Phase Detection), such as lack of modulation or DVD-ROM, running short. Although the reflection factor after heat treatment rose especially by the aluminum-germanium two-layer film indicated by JP,6-171236,A, when realizing transposition with ROM, it had become the technical problem of the optical recording medium which uses the AlGe two-layer film to reduce the reflection factor after heat treatment, and to obtain the 60 above-mentioned% or more of modulation.
[0004]
[Means for Solving the Problem] The postscript mold optical recording medium by this invention has a recording layer on the optical interference layer the translucent layer on a substrate, and on this, and an optical interference layer at least. A recording layer has the 1st recording layer which consists of a metal, semimetals, or these alloys, and the 1st recording layer and the 2nd recording layer which consists of germanium which can be alloyed.
[0005] The construction material of the 1st recording layer is aluminum, Au, Ag, Cu, Pt, Pd, Sb, Te, In, Sn, Zn, etc., and contains a compound and an alloy. The construction material of a substrate is the well-known transparent bodies, such as a polycarbonate and glass, a translucent aluminum thin film, a translucent Au thin

film, a translucent Si thin film, etc. are the construction material which has absorption, and the translucent layer on this is the translucent body which has predetermined permeability and a reflection factor. A phase change ingredient is also usable as a translucent layer. Optical interference layers are well-known dielectrics, such as ZnS-SiO2, SiO2 and MgF, Si-N, In-O, and Zn-O. In the 2nd above of this invention, 60% or more of thing corresponds [modulation].
[0006] In a postscript mold optical recording medium according to claim 3, the 1st recording layer is used as Au, Cu, Ag, or these alloys, and thickness of the 1st recording layer is set to 30nm or less. In a postscript mold optical recording medium according to claim 4, use the 1st recording layer as aluminum or these alloys, and let thickness of this 1st recording layer be the range of 20nm or less.

[0007] Furthermore, in the postscript mold optical recording medium according to claim 5, the 1st recording layer is arranged at the side near the plane of incidence of readout light, and the lamination of a recording layer has the composition that the reflection factor of a record mark part falls.
[0008] It is characterized by these being in the range of 1.9 <=n<=2.50.25 <= nd/lambda <=0.35600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in 2, 3, 4, or 5 of the 6th this invention. [of this invention]
[0009] It is characterized by these being in the range of 1.4 <=n<1.60.33 <= nd/lambda <=0.41600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in the 2nd [of this invention] of the 7th this invention, and 3, 4 or 5.
[0010] It is characterized by these being in the range of 1.6 <=n<1.90.31 <= nd/lambda <=0.37600 nm<=lambda <=680nm in the expression which expresses the refractive index of an optical interference layer as n, and expresses d and record wavelength as lambda for thickness in the 2nd [of this invention] of the 8th this invention, and 3, 4 or 5.
[0011] It is characterized by setting a translucent layer to Au or Ag in the 6th [of this invention] of the 9th this invention, and making thickness of this translucent layer into the range of 5-16nm. It is the postscript mold optical recording medium characterized by setting a translucent layer to aluminum in the 6th [of this invention] of the 10th this invention, and making thickness of ** aluminum into the range of 1-2nm.
[0012]
[Function] In this invention, an optical interference layer exists in the front face of a recording layer. Although modulation and control of a reflection factor have an operation of this optical interference layer, the above-mentioned operation increases by making a translucent layer intervene between a substrate and an optical interference layer.
[0013] There is fixed relation to the desirable thickness and the desirable refractive index of an optical interference layer. Moreover, although it is so desirable that the real part of a refractive index is small and imaginary part is moderately large as an optical absorption layer, it depends for the suitable range of the thickness of this optical absorption layer to the optical constant of an optical absorption layer strongly.

[0014] Although the laminating sequence of the 1st recording layer and the 2nd recording layer is arbitrary, thereby, the reflection factor change at the time of record is specified. It is necessary to reduce the reflection factor of a record mark part from a viewpoint of taking transposition with DVD-ROM, and this is realized when the 1st recording layer is arranged at a side with the lamination of a recording layer near the plane of incidence of readout light. In this case, when the 1st record layer membrane thickness is large, lowering of optical absorption, aggravation of the record sensibility by buildup of thermal diffusion, or the increment in a jitter becomes a problem, and an upper limit is in excess at desirable record layer membrane thickness. Moreover, the thickness of the 1st recording layer and the 2nd recording layer is a parameter relevant to the amplitude and phase contrast of the reflected light by the recording layer before and behind alloying, and affects modulation etc.

[0015]

[Embodiment of the Invention] The lamination of the postscript mold optical recording medium used for drawing 1 by this invention is shown. The sequential deposition of the recording layer 4 which consists of the optical absorption layer 2, the optical interference layer 3, the 1st recording layer 104, and the 2nd recording layer 105 on the polycarbonate substrate 1, and the environmental protection layer 5 which consists of resin is carried out. The optical absorption layer 2 consists of Au or aluminum. The optical interference layer 3 is ZnS-SiO2 or SiO2. The 1st recording layer 104 is Au, Ag, Cu, ~~aluminum, etc.~~ The 2nd recording layer 105 consists of germanium. With this configuration, the reflection factor of the mark section after record falls. The track pitch of a substrate is 0.74 micrometers.

[0016] The record wavelength of 635nm of the postscript mold optical recording medium of this configuration, the record linear velocity of 7m/s, and the 2nd record layer membrane thickness dependency of the reflection factor and modulation in record by 0.267micrometers [/bit] data bit length are shown in a table 1. 10nm and the record playback wavelength of the thickness of the 1st recording layer 104 to which the thickness of the optical interference layer 3 to which the thickness of the optical absorption layer 2 which consists of Au changes from 7nm and ZnS-SiO2 with a table 1 changes from 95nm and aluminum are 635nm. About 50nm and big modulation are obtained for the thickness of the 2nd recording layer 105 by about 100nm. The real part of germanium of a refractive index is large, since the absorption coefficient is comparatively small, germanium itself acts as an interference layer and it affects the phase contrast of the reflected light of a reflection factor, modulation, and a record condition and the condition of not recording. For improvements, such as a jitter, an additional heat dissipation layer or an interference layer may be deposited on germanium layer.

[0017]

[A table 1]

半透明層Au:7nm、光干渉層ZnSSiO2:95nm

	第1記録層材料	第1記録層膜厚(nm)	第2記録層Ge膜厚(nm)	反射率(%)	モジュレーション(%)
比較例1	Al	10	0	26.8	0.0
実施例1	Al	10	10	14.0	25.0
実施例2	Al	10	20	23.8	50.0
実施例3	Al	10	30	35.0	68.0
実施例4	Al	10	50	30.8	77.3
実施例5	Al	10	70	21.0	70.0
実施例6	Al	10	100	30.1	78.1

[0018] Modulation in case the 1st recording layer 104 is Ag, and the 1st record

layer membrane thickness dependency of a reflection factor are shown in a table 2. When Ag thickness exceeds 30nm, modulation falls. Moreover, about record sensibility, the direction when Ag thickness is thin is desirable at the relation between heat conduction and the rate of optical absorption of a recording layer. That is, when the thickness of the 1st recording layer of Ag is thick, absorption of a record laser beam is small, and the thermal diffusion by heat conduction is large, and heating takes great energy. Ag thickness has desirable 30nm or less also from this point.

[0019]

[A table 2]

半透明層Au:7nm、光干渉層ZnSSiO2:95nm

	第1記録層材料	第1記録層膜厚(nm)	第2記録層Ge膜厚(nm)	反射率(%)	モジュレーション(%)
比較例2	Ag	0	30	18.9	0.0
実施例7	Ag	5	30	21.0	68.7
実施例8	Ag	10	30	28.0	75.0
実施例9	Ag	15	30	34.3	71.4
実施例10	Ag	20	30	42.0	75.0
実施例11	Ag	30	30	51.8	75.7
実施例12	Ag	50	30	60.2	73.3

[0020] Modulation in case the 1st recording layer is aluminum, and the 1st record layer membrane thickness dependency of a reflection factor are shown in a table 3. As compared with Ag, the absorption coefficient of aluminum is large, and the thickness which gives the maximum of modulation is about 20nm. aluminum thickness has desirable 20nm or less from a viewpoint of record sensibility as well as the above.

[0021]

[A table 3]

半透明層Au:7nm、光干渉層ZnSSiO2:95nm

	第1記録層材料	第1記録層膜厚(nm)	第2記録層Ge膜厚(nm)	反射率(%)	モジュレーション(%)
実施例13	Al	5	30	25.2	52.8
実施例14	Al	10	30	35.0	68.0
実施例15	Al	15	30	42.0	70.0
実施例16	Al	20	30	43.4	71.0
実施例17	Al	30	30	44.8	68.8
実施例18	Al	50	30	46.2	59.1

[0022] The reflection factor at the time of using an optical interference layer as ZnS-SiO2 thin film whose refractive index with a record wavelength of 635nm is 2.17, and modulation are shown in a table 4. The 1st recording layer is aluminum:10nm and the 2nd recording layer is germanium:30nm. The maximal value of modulation is near 85nm of thickness of an optical interference layer, and, as for modulation, nd/lambda becomes 60% or more in 0.25-0.35.

[0023]

[A table 4]

第1記録層Al:10nm、第2記録層Ge:30nm

	半透明層Au膜厚(nm)	光干渉層ZnSSiO2膜厚(nm)	nd/λ	反射率(%)	モジュレーション(%)
実施例19	7	55	0.188	45.5	44.8
実施例20	7	65	0.222	39.2	55.4
実施例21	7	75	0.256	32.9	61.7
実施例22	7	85	0.290	32.9	72.3
実施例23	7	95	0.325	35.0	68.0
実施例24	7	105	0.359	42.7	59.0
実施例25	7	115	0.393	49.0	50.0

[0024] The reflection factor at the time of using an optical interference layer as SiO2 thin film whose refractive index with a record wavelength of 635nm is 1.457, and modulation are shown in a table 5. The maximal value of modulation is near 160nm of thickness of an optical interference layer, and, as for modulation, nd/lambda becomes 60% or more in 0.33-0.41.

[0025]
[A table 5]

第1記録層Al:10nm、第2記録層Ge:30nm

	半透明層Au膜厚(nm)	光干渉層SiO2膜厚(nm)	nd/λ	反射率(%)	モジュレーション(%)
実施例26	10	130	0.298	42.0	50.0
実施例27	10	145	0.333	35.0	60.0
実施例28	10	160	0.367	35.0	64.0
実施例29	10	175	0.402	38.5	63.8
実施例30	10	190	0.436	49.0	45.7

[0026] The reflection factor at the time of using an optical interference layer as 20aluminum3 thin film whose refractive index with a record wavelength of 635nm is 1.766, and modulation are shown in a table 6. The maximal value of modulation is near 120nm of thickness of an optical interference layer, and, as for modulation, nd/lambda becomes 60% or more in 0.31-0.37.
[0027]
[A table 6]

第1記録層Al:10nm、第2記録層Ge:30nm

	半透明層Au膜厚(nm)	光干渉層Al2O3膜厚(nm)	nd/λ	反射率(%)	モジュレーション(%)
実施例31	8	90	0.250	41.3	44.1
実施例32	8	100	0.278	38.6	52.7
実施例33	8	110	0.306	35.0	58.0
実施例34	8	120	0.334	35.0	64.0
実施例35	8	130	0.362	37.1	62.3
実施例36	8	140	0.389	43.4	54.8
実施例37	8	150	0.417	49.7	49.3

[0028] The reflection factor at the time of setting a translucent layer to Au and the translucent layer membrane thickness dependency of modulation are shown in a table 7. The 1st recording layer is [aluminum:10nm and the 2nd recording layer of a recording layer] germanium:30nm. Modulation exceeds 60% by 5-15nm of Au thickness.
[0029]
[A table 7]

第1記録層Al:10nm、第2記録層Ge:30nm

	半透明層Au膜厚(nm)	光干渉層ZnSSiO2膜厚(nm)	nd/λ	反射率(%)	モジュレーション(%)
比較例3	0	95	0.325	50.4	50.0
実施例38	3	95	0.325	44.1	55.6
実施例39	5	95	0.325	38.5	63.6
実施例40	7	95	0.325	35.0	68.0
実施例41	10	95	0.325	26.0	76.3
実施例42	15	95	0.325	18.9	81.5
実施例43	20	95	0.325	11.9	58.8

[0030] The reflection factor at the time of setting a translucent layer to aluminum and the translucent layer membrane thickness dependency of modulation are shown in a table 8. The 1st recording layer is [aluminum:10nm and the 2nd recording layer of a recording layer] germanium:30nm. Modulation exceeds 60% by 1-2nm of aluminum thickness. In addition to this, phase change ingredients, such as AgInSbTe and GeSbTe, are usable as a translucent layer, and since a translucent layer is crystallized with the heat energy at the time of record in this case, an optical constant changes and it also has the operation as an auxiliary recording layer.
[0031]
[A table 8]

第1記録層Al:10nm、第2記録層Ge:30nm

	半透明層Al膜厚(nm)	光干渉層ZnSSiO2膜厚(nm)	nd/λ	反射率(%)	モジュレーション(%)
比較例3	0	95	0.325	50.4	50.0
実施例44	1	95	0.325	33.8	64.6
実施例45	2	95	0.325	15.4	63.6
実施例46	3	95	0.325	7.0	40.0
実施例47	5	95	0.325	12.8	0.0

[0032] By this invention, more than modulation 60% was obtained by the lamination to which the reflection factor of a record condition falls in germanium and the optical recording medium which has the 1st recording layer which can be alloyed as mentioned above. In addition, ****** of the optical recording medium used for this invention is not limited above, but **** of the arbitration of a well-known optical recording medium is possible for it.

[0033]

[Effect of the Invention] Therefore, the effectiveness of the following [bottom] produced this invention like the above. The modulation of the inorganic system postscript mold optical recording medium which is excellent in a power margin improved, and the refreshable postscript mold optical recording medium was obtained by the general-purpose drive of DVD-ROM etc.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The lamination of the postscript mold optical recording medium of this invention is shown.
[Description of Notations]
1 Polycarbonate Substrate
2 Optical Absorption Layer
3 Optical Interference Layer
4 Recording Layer
5 Environmental Protection Layer
104 1st Recording Layer
105 2nd Recording Layer

[Translation done.]